"The Influence of Desiccation on Human Normal Isohem-agglutinins"

JOHN A. KOLMER, M.D.
PHILADELPHIA

Reprinted from The Journal of the American Medical Association
Nov. 8, 1919, Vol. 73, pp. 1459 and 1460

"The Influence of Desiccation on Human Normal Isohem-agglutinins"

JOHN A. KOLMER, M.D.
PHILADELPHIA

"THE INFLUENCE OF DESICCATION ON HUMAN NORMAL ISOHEMAGGLUTININS"

To the Editor:—In THE JOURNAL, October 18, Karsner and Koeckert described the deterioration of normal human isoagglutinins within from two to three weeks and loss of group specificity within from three to five weeks, after drying of serums. Owing to the practical importance of this subject in view of the wide adoption of Sanford's method of using serum dried on cover glasses (THE JOURNAL, April 27, 1918, p. 1221), I believe that the results of additional investigations in this subject may be of some interest.

For several years, I have been under the impression not only that drying rabbit antihuman serum in filter paper after the method of Noguchi results in affording a good method for preserving and handling antihuman hemolysin, but also that the use of these papers yields less agglutination of the corpuscles in the conduct of complement fixation tests than serums preserved in the fluid state. During the past year, two of my students, Sands and West (Experiments on the Removal of Hemagglutinins from Rabbit Antihuman Sera, *J. Immunol.*, to be published), have found that drying these immune serums at room temperature usually results in some deterioration of the hemagglutinins, affording an explanation of the better results sometimes observed in the conduct of complement fixation tests with dried antihuman serum, owing to a reduction or removal of the very bothersome hemagglutinins.

Studies were then made on the influence on hemagglutinins and hemolysins in normal human serums for the corpuscles of persons and certain of the lower animals, of drying the serums at room temperatures on cover glasses as described by Sanford and in filter paper, as described by Hartman (THE JOURNAL, Nov. 16, 1918, p. 1658). The general results of this investigation (Kolmer, J. A.: The Influence of Desiccation on Natural Hemolysins and hemagglutinins in Human Sera, *J. Immunol.*, to be published), were to show that both hemagglutinins and hemolysins in normal human serums frequently undergo considerable deterioration within the first to the fourth day after drying. However, when human serums containing large amounts of these hemagglutinins were chosen for drying on cover glasses and properly preserved in a refrigerator as described by Sanford, satisfactory agglutination tests were observed over a period of two to three weeks at least. Unfortunately, I did not test the specificity of the agglutinins in dried serums, as have Karsner and Koeckert, and their observations along this line are unique

and of considerable interest and worthy of further study. I am quite sure that it is unwise to rely on the results of negative hemagglutination reactions with dried serums in the typing of bloods unless preliminary tests have shown that specific agglutinins remain in the serum for at least a week after drying. The natural hemolysins in human serums for the corpuscles of persons and certain of the lower animals were found even slightly more susceptible to deterioration by desiccation.

While immune hemagglutinin, as that for human corpuscles, produced in rabbits as a result of immunization with human blood also undergo deterioration when the serums are dried, yet the amount present in the serum of a well immunized rabbit is so large that after the serum has been dried on cover glasses and the latter have been kept in a refrigerator, sufficient agglutinin escapes destruction to yield strong and very satisfactory results. The problem at hand is the production of these immune agglutinins specific for the four types of human corpuscles. I hope to be able to report my experiments in this field in the near future, but may state at present that multiple injections of any one type of corpuscles in rabbits results in the production of most agglutinin for these cells, and that the group agglutinins for the other types of corpuscles also produced may be removed by methods of absorption. These experiments offer considerable hope that it may be possible to produce specific agglutinating serums for all types of human corpuscles and thereby greatly facilitate the typing of bloods.

I may also state in this connection that the practice of relying on agglutination tests alone for the matching of bloods prior to transfusion is open to criticism. In the course of an investigation on hemolysins and agglutinins in normal human serums for the corpuscles of persons and the lower animals, conducted by M. E. Trist, A. M. Flick and myself (A Study of the Natural Thermolabile and Thermostabile Hemolysins and Hemagglutinins in Human Sera in Relation to the Wassermann Reaction, *Am. J. Syphilis*, to be published), it was found that hemolysins may be present in serums free of agglutinin for the same corpuscles, and it is possible that these isohemolysins may be responsible for some of the reactions following the transfusion of bloods free of agglutinins. For this reason I believe that tests preliminary to blood transfusion should include an examination for hemolysins as well as agglutinins, and dried serums are not suitable in tests for the latter. For these reasons, I agree with Karsner and Koeckert that undried serums put up in small capillary tubes are better adapted for the grouping of blood than dried serums; but since both hemagglutinins and hemolysins in normal human serums are quite susceptible to heat, the serums should be kept at or near the freezing point.

John A. Kolmer, M.D., Philadelphia.